AMENDMENTS TO THE SPECIFICATION

Replace the paragraph starting on page 13, line 1, with the following:

--Figure 1 shows a schematic view of an oil or gas well, fitted with a highway 100 for deploying and retrieving sensors and carrying out permanent downhole measurements, including the measurement of downhole pressure. Figure 1 shows a production tubing string 11, surrounded by a casing string 12, a perforated section of the casing 13, to allow the inflow of hydrocarbon fluids 14 from the hydrocarbon reservoir into the well. The well is completed by a wellhead 15 that includes valves 16 for shutting the well in. A packer 17 is placed in the wellbore in the annular space formed between the casing 12 and the production tubing 11 to prevent the upper region of the annulus from being directly connected to the well bore pressure. The packer 17 is shown with a high-pressure penetrator 18 that allows the hydraulic control lines 19, which constitute part of the sensor highway 100, to pass through the packer. Typically the control lines are ¼ inch in diameter and are made of stainless steel. It can be convenient to coil the control lines around the production string at one or more regions along that string. The control lines can be secured to the production string by clamps 110, which also serve to protect the control lines from damage during installation. The sensor highway 100 is shown exiting the wellhead through high pressure seals 111, past valves 112 which serve as emergency pressure seal and then through high pressure feed-through devices 113 where the fibre optic cables emerge while maintaining a pressure seal between the ambient surface environment and the interior of the sensor highway. The sensor highway 100 comprises optical fibre cables and sensors. The sensors can include by way of example only pressure sensors, distributed temperature sensors, acoustic sensors, electric and magnetic field sensors, composition sensors and other types of sensors. The sensors or their associated cables need not necessarily be fibre optic types. The cable itself does not need to be connected to a sensor at all but can instead be used to communicate to an optical switch used to control downhole valves and machinery remotely. It is advantageous that the cables and sensors should be capable of being located to the remote locations by fluid flow, and thereby benefit from being retrievable and replaceable. In Figure 1 the sensor highway 100 is shown to reverse directions at a point 124 below the packer

17. The return leg of the highway shown in Figure 1 includes a flow control element 115 located above the packer for example only. This device 115 is configured to have two states, one of which can prevent flow of fluid in the upward direction or reduce flow to a reduced and acceptable rate. When the device is in the second state, fluid can flow freely in both directions. Preferably, a flow control element is used in both legs of the highway. Near the turn-around point 124, is shown a connection 116 to another section of control line that is shown to contain a flow control element 117 and which continues along the production string 11. Sensors that are deployed by used of the highway generally are prevented from entering the continuation of the control line beyond the turn-around region leading to the hydrocarbon reservoir. A distributed temperature sensor, such as can be used in conjunction with a distributed temperature sensing system, such as a DTS 80, available from York Sensors of Winchester, England, can be deployed in a single ended mode where the end of the sensor cable will be inside the highway 100, or in a double ended mode, where the sensor enters the highway in one leg and emerges at the surface from the other leg of the highway. Generally other sensors such as pressure, acoustic, electric field and composition sensors operate in reflection mode and hence enter the down-leg of the highway during deployment, but only emerge from the other end of the highway when they need to be retrieved from the highway. For example, a typical polarimetric pressure sensor, such as is available from SensorDynamic of Winchester, England, and its associated cable would enter the highway at the high pressure seal and the sensing part of the assembly would be located near the turn-around point of the highway, either in the down leg or in the up leg. The well bore pressure location ~~121~~ 125 is communicated along the liquid pathway which starts at 121, connects to the barrier fluid reservoir 118 at connection 123 and passes through the barrier fluids 121 and 122 inside the ~~chamber~~ reservoir 118, exits via connection 119 and continues through control line via connection 116 to the pressure transducer 114. In general it is preferable to have the end of the sensor and cable assembly pass the turn around point 124. This has the advantage that if fluid enters the highway from the hydrocarbon reservoir side of the highway, then the fluid flow will not cause the pressure sensor to change its position significantly. This will also be advantageous in the event that gas enters the highway. In this configuration, gas will be unable to enter the

sensor capillary packaging and fluid barrier. Such a change in position could result in a change in the pressure reading.--

Replace the paragraph starting on page 17, line 1, with the following:

--A second example of the first embodiment of the present invention treats the case of the under-pressure well. As fluids are extracted from the hydrocarbon reservoir, the operating downhole pressure ~~well decreases~~ will decrease; the height of fluid column that is sustained in the highway will also drop. It is to be expected that the downhole pressure during normal production will reach a point where the highway fluid will drop to a level below the uppermost point in the highway, leaving a section of highway control line that does not contain liquid. In the event of a well being temporarily shut in, the resulting transient in downhole pressure will tend to push fluid into the highway until the weight of the column balances the downhole pressure. It is preferable to minimise the amount of fluid that has to be transferred into the highway to equalize the pressure during a well shut down. This minimises the required volume of the fluid reservoir between the highway and the well bore fluid. Minimising the flow will also minimise the error in the sensor reading due to pressure drops between the sensor and the well bore. In general it is desirable to have a fluid pathway between hydrocarbon reservoir and sensing location that has a low impedance to fluid flow. Hence, connections from point ~~121~~ 125 into the barrier reservoir 118 and between 119 and the sensing location 114 are preferably as short as convenient and with a bore as large as is practical.--